

CANDIShare: A Resource for Pediatric Neuroimaging Data

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Introduction

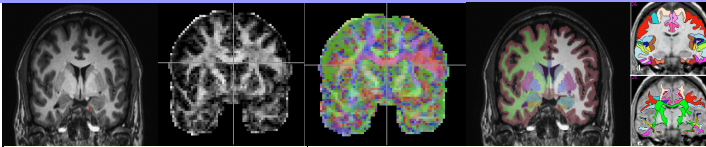
There are numerous psychiatric disorders that can plague the development of children. Each of these disorders manifests as a distinct pattern of clinical, behavioral, etiological, neuroanatomic and neurofunctional characteristics that challenge the management of the individual patient, as well as the development of successful intervention and prevention strategies. In the area of neuroimaging, a substantial number of studies have been performed to date; and while much has been learned from this investment, this represents only the tip-of-the-iceberg of the information that can be gleaned from the data. Unfortunately, most of this additional, untapped information resource is lost due to ineffective use of the principles of data sharing and integration.

Approach

Released as the 'CANDI Neuroimaging Access Point' project at NITRC (http://www.nitrc.org/projects/candi_share/), we are making a large set of MR image and anatomic analysis data available to the general neuroinformatics community (See Table.). These data include: a) **Image data** - including structural and diffusion imaging at 1.5 and 3.0 Tesla, where each subject includes a comprehensive set of clinical, demographic and behavioral measures; b) **results for general segmentation** (subdivision of the imaged brain in terms of gross neuroanatomic subdivisions of gray, white and CSF tissue classes) **and parcellation** (regional compartmentalization of cortex and white matter); and c) the creation and dissemination of static **probabilistic atlases** from specific subsets of these data for use in other segmentation and analysis frameworks.

CANDIShare Data Release

Raw Image Data Anatomic Segmentation and Parcellation



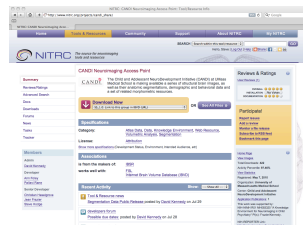
Classes of MR image data and results of analysis: structural and diffusion imaging.

Classes of Anatomic Segmentation. a) 'general segmentation', b) cortical parcellation, and c) white matter parcellation.

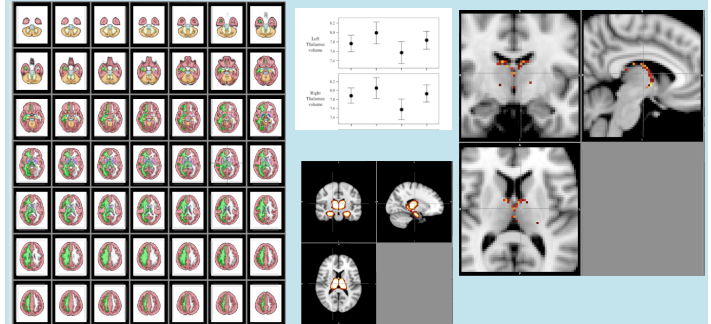
Diagnosis	Gender	n	Field Strength	Follow-up	Total Scans	Age (years)	Range	Segmented	Parcellated
						Mean	Min. Max.	N	N
Control	H	25	1.5	0	80	11.5	5.0 - 16.0	17	24
	F	21	3.0	0	68	10.5	3.0 - 15.0	0	0
ADHD	H	25	1.5	7	51	12.1	3.8 - 18.0	7	25
	F	22	3.0	0	66	10.5	3.0 - 15.0	0	0
AS-BPD	H	20	1.5	4	21	8.4	2.0 - 13.0	7	13
	F	21	3.0	0	42	11.8	3.8 - 16.0	0	0
BPD	H	5	3.0	0	12	9.5	2.2 - 13.4	0	0
	F	17	1.5	4	26	12.3	3.0 - 17.0	0	14
BPD w/ ASD	H	22	1.5	4	29	11.6	3.7 - 17.1	15	19
	F	22	3.0	2	32	14.9	3.7 - 19.0	11	23
Schiz	H	15	3.0	2	32	11.9	11.1 - 14.4	0	0
	F	15	1.5	0	30	11.5	11.1 - 14.4	0	0

Abbreviations: ADHD = Attention Deficit Hyperactivity Disorder; AS-BPD = Asperger's Disorder; BPD = Bipolar Disorder; BPD w/ ASD = Bipolar Disorder with Psychotic Features; BPD/ASD = BPD with comorbid ASD; Schiz = Schizophrenia; ASD = Early-Onset Schizophrenia Spectrum Disorder.

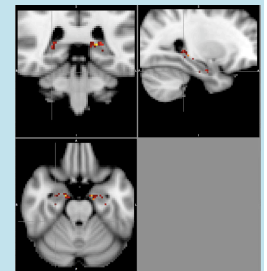
Note: All 3.0 scans also have 72-direction diffusion tensor acquisitions. Additional acquisitions, under separate funding, are continuing. Continuous analysis are supported by separate funding. Follow-up refers to the number of Total Scans that, to date, have been requested for longitudinal assessment.



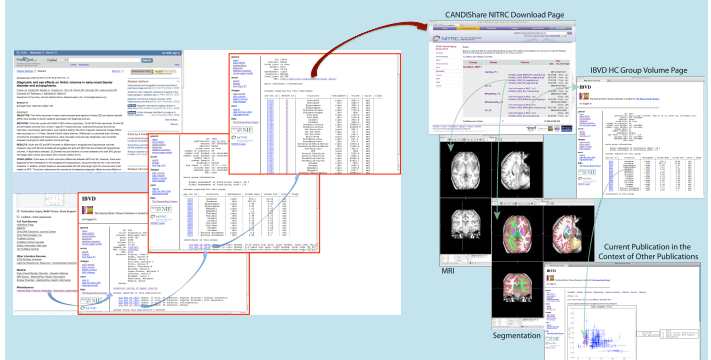
Probability Mapping



From the data release, segmentation probability maps are generated for each anatomic structure in each diagnostic group (left - example for HC). These are in the MNI152 template space. We can now expand volumetric findings (i.e. middle top) in terms of the differences in anatomic labeling probabilities (i.e. middle bottom for Thalamus and Hippocampus in HC) between the groups (i.e. right top and bottom for labeling probability differences for thalamus between HC and SS and hippocampus between HC and BPDwPsy, respectively).



Data and Resource Accessibility



Conclusion and Summary

This release of information is dramatically greater than merely 'making the images available': each image is associated with substantial analytic results, many of which have been utilized in the preparation of various publications and comparisons. Moreover, these data will be most effectively shared with the research community when shared in a way that preserves the linkages between the images, the resultant analytic data and meta-data, and it's relationships to other public sources of related information.

References:

- Frazier JA, *et al.* Diagnostic and sex effects on limbic volumes in early-onset bipolar disorder and schizophrenia. *Schizophrenia Bull.* 2008 Jan;34(1): 37-46
- Kennedy DN, *et al.* CANDIShare: A Resource for Pediatric Neuroimaging Data. *Neuroinformatics.* 2011 Oct 18.

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